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ABSTRACT

Longitudinal studies conducted with children typically experience non-response problems that can make substantial inroads on sample size and introduce bias into the analysis. Three methods for limiting non-response in school-based research programs were assessed: (1) asking parents to return consent forms only if they do not want their children to participate in the research; (2) conducting make-up sessions for students who are absent during the scheduled data collection day; and (3) tracking students who transfer out of the participating schools. These methods were used in a large-scale intervention study, involving nearly 10,000 junior high school students, designed to assess the effects of a smoking and drug use prevention curriculum for adolescents (Project ALERT) across 30 schools in 8 school districts in California and Oregon. The evaluation data, which consist of surveys and saliva samples, were collected in the classrooms before the 7th grade curriculum was delivered and 3, 12, 24, and 36 months after it was delivered. Each method substantially reduced the anticipated loss of participating students over a 2-year period; each method also reduced attrition bias attributable to the loss of at-risk students (those with characteristics such as poor grades, prior deviance, and past drug experience that made them likely candidates for using drugs in the future). By using a multistage parent consent process that included multiple communication channels, the risk of mistakenly treating non-response as consent was minimized, and the loss of between 40% and 50% of the targeted population at the onset was avoided. Over several waves of data collection, make-up sessions reduced the losses attributable to absenteeism by an average of about 60%, recapturing close to 6% of the baseline sample each year. The tracking process retrieved surveys from two-thirds of the transferees, and cut the overall attrition rate in half. Two tables and one figure illustrate the study. (SLD)

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Limiting Nonresponse in Longitudinal Research: Three Strategies for School–Based Studies

Phyllis L. Ellickson

March 1989

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Limiting Nonresponse in Longitudinal Research: Three Strategies for School–Based Studies

Phyllis L. Ellickson

March 1989

Prepared for
The Conrad N. Hilton Foundation

RAND

PREFACE

This research and the multisite experiment to which it was applied were supported by a grant from the Conrad N. Hilton Foundation. The study reported in this Note was undertaken to describe and assess three methods for limiting nonresponse in multiyear, school-based research programs. The findings should be of interest to researchers and practitioners concerned with child and adolescent behavior who rely on respondent data collected in the school setting.

SUMMARY

Longitudinal studies conducted with children typically experience nonresponse problems that can make substantial inroads on sample size and introduce bias into the analysis. This Note describes and assesses three methods for limiting nonresponse in school-based research programs: (1) asking parents to return consent forms only if they do not want their child to participate in the research; (2) conducting make-up sessions for students who are absent during the scheduled data collection; and (3) tracking students who transfer out of participating schools.

These methods were used in a large-scale, longitudinal study designed to assess the effects of a smoking and drug prevention curriculum for adolescents across 30 schools in California and Oregon. Each method substantially reduced the anticipated loss of participating students over a two-year period; each also reduced attrition bias attributable to the loss of at-risk students—those with characteristics such as poor grades, prior deviance, and past drug experience that make them likely candidates for using drugs in the future.

ACKNOWLEDGMENTS

Several people contributed to the research discussed in this Note. Jennifer Hawes-Dawson collaborated on the assessment of methods for obtaining parental consent. Domenica Bianca and Diane Schoeff developed the procedures for tracking students and monitoring the results of that effort. Differences between baseline respondents and nonrespondents were analyzed by Robert Bell and Cyndie Gareleck. This Note has also benefited from the helpful review provided by Sandra Berry, the editorial assistance of Janet DeLand, and Velda Cosentine's careful preparation of the manuscript.

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LIMITING NONRESPONSE IN LONGITUDINAL RESEARCH: THREE STRATEGIES FOR SCHOOL-BASED STUDIES

One of the most intractable problems encountered in longitudinal research is that of nonresponse among members of the target population. School-based studies face three particularly troublesome sources of nonresponse—lack of parental consent for student participation in the research, student absenteeism when data collection takes place, and students who transfer out of participating schools. Each of these problems makes substantial inroads on sample size; each also leads to disproportionately high losses of particular groups—minority children, those who do less well in school, and those who are "at risk" for engaging in problem behavior (Ellickson, Bianca, and Schoeni, 1988; Battjes and Bell, 1985; Polk and Ruby, 1978).

This Note describes how these problems have been addressed in a large-scale experiment currently being conducted in 30 junior high schools from eight school districts in California and Oregon. The experiment, called Project ALERT, is designed to evaluate a smoking and drug prevention program across widely diverse school environments: the school districts include urban, suburban, and rural communities; in nine of the 30 schools, minorities constitute 50 percent of more of the population (Ellickson, 1984a, 1984b). The evaluation data, which consist of surveys and saliva samples, are being collected in the classroom at six points in time—before the 7th grade curriculum was delivered, and 3, 12, 15, 24, and 36 months later.

Because the evaluation seeks to assess the program's impact on adolescent drug use over several years, it was especially important to limit sample attrition over time, particularly the loss of children whose pre-program attributes and behavior put them at risk for initiating or deepening drug involvement. We attempted to minimize nonresponse by (1) using passive, as opposed to active, parental consent procedures; (2) holding make-up sessions for students who were absent on the day of data collection; and (3) tracking students who transferred out of participating schools. These three approaches are described and assessed below.

MAXIMIZING PARENTAL RESPONSE TO REQUESTS FOR CONSENT

Requiring active consent from parents (a signed form for every student participating in an evaluation) typically produces substantially reduced sample sizes—ranging between 50 and 60 percent of the target group (Donovan, Jessor, and Costa, 1988; Josephson and Rosen, 1978; Lueptow et al., 1977). An active consent requirement also tends to result in underrepresentation of groups that are important to include in drug prevention research—minorities, low achievers, and children who have already tried drugs (Kearney et al., 1983; Severson and Ary, 1983; Thompson, 1984). Low initial response rates and biased samples can jeopardize a study's results from the beginning and call into question the wisdom of proceeding further.

Passive consent procedures (where parents return a form only if they do *not* want their child to participate) typically produce substantially higher participation rates. However, many observers fear that this method risks including children whose parents actually oppose participation in the evaluation but failed to return the form. These observers interpret nonresponse to active consent among at-risk groups as reflecting parental concern that their children are more likely to be jeopardized by the research. They also question whether the parents who fail to return a form have actually received the materials.

To evaluate these risks, we conducted a pilot study of both methods in two junior high schools in the Los Angeles area.[1] After sending the materials to 117 parents in the school assigned to passive consent, we waited two weeks for them to respond. Four sent in refusals. We then called the remaining 113 parents to ascertain whether they had received the consent materials and understood what the data collection entailed. We reached 94 of them.

These calls triggered only four more refusals, indicating that equating nonresponse with permission accurately reflected the wishes of 96 percent of the parents we reached by phone. Moreover, in response to a structured set of questions, the great majority of these parents (87 percent) specifically said they had received the materials, understood them, and decided to allow their child to participate. None of the packets were returned as undeliverable, and of the 13 percent who indicated they did not remember getting a copy of the letter, only one family was no longer at the address provided by the school. These figures suggest that the original packet was probably delivered, but that parents either misplaced it or failed to read the materials carefully.

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[1]See Ellickson and Hawes (in press) for a detailed description of this study and its results.

Based on these results, we concluded that the likelihood of falsely labeling nonresponse as consent is small. Nevertheless, we were concerned about the parents who had apparently received the consent package in the mail but did not remember seeing it. Experience in the active consent school, where we sent materials home with each child as well as through the mail, suggested that using school channels of communication provided an effective backup method for reaching parents. At least 20 percent of the forms returned by parents contacted through both communication channels could be attributed to the school-based solicitation.

For the main experiment, therefore, we designed a multistage passive consent process for informing parents. We first sent the materials by regular first-class mail; we then followed up with a postcard reminder and later sent a duplicate of the original consent package home with each child. These repeated efforts to contact parents were designed to maximize the likelihood that they would both receive the consent package *and* pay attention to it. The consent package included a letter from the school principal plus a detailed fact sheet about the prevention program and the evaluation activities; these materials were translated into Spanish for schools with substantial proportions of Spanish-speaking students.[2] We allowed four weeks for the parents to respond.

How did this process work? First it clearly succeeded in meeting requirements for making sure parents were informed about the research. Through four waves of data collection involving close to 10,000 students, only one parent later complained that he had not known about the study.[3] The fact that the process involved multiple schools with diverse student populations and community settings further attests to the efficacy of using a multistage consent procedure for reaching parents.

Second, the parent refusal rate, 8.5 percent, was considerably lower than the 40 to 50 percent nonresponse rate we might have expected if we had required active consent. Across the eight districts, the refusal rates ranged from just under 6 percent to 11 percent.

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[2]We also instituted and maintained strict procedures for protecting data confidentiality. These included identifying student questionnaires by number rather than name; precluding teachers and other nonresearch personnel from seeing or handling student surveys; training the data collection teams on the importance of privacy protection and how to maintain it; locking material that connected student names with identification numbers in restricted-access files; and obtaining a certificate of confidentiality from the Department of Health and Human Services.

[3]The student's data were deleted from the analysis files.

Third, the passive consent process substantially reduced the loss of at-risk students. While we lacked data on prior drug use among students whose parents refused participation, we were able to compare them with baseline respondents along the following dimensions: grades in mathematics and English during 7th grade, frequency of absences during 7th grade, and ethnicity. That comparison indicated that students whose parents refused consent for the evaluation component were significantly *more* likely than participating students to come from Asian families, slightly more likely to have higher grades, and equally likely to have a record of frequent absences.[4]

Numerous studies have consistently linked poor school performance and absenteeism with drug use initiation and abuse (Brunswick and Messeri, 1985; Chassin, Mann, and Sher, 1988; Johnston, 1973; Kandel, Kessler, and Margulies, 1978; Newcomb, Maddahian, and Bentler, 1986; Skinner et al., 1985); our analyses show that 7th and 8th grade students with Asian backgrounds are significantly less likely to use cigarettes, alcohol, or marijuana than their non-Asian classmates. In contrast to results of studies performed with active consent, therefore, our experience suggests that if any bias results from passive consent, it favors the at-risk students—retaining those who are more likely to engage in drug use or other deviant activities and losing those who are less prone to problem behavior.

REDUCING NONRESPONSE DUE TO ABSENTEEISM

Our next task was to limit nonresponse attributable to absences on the day of data collection. To do this, we instituted make-up sessions, which were typically held one or two days after the scheduled data collection for each school; that is, they were designed to "recapture" students whose absence was caused by short-term factors—a brief illness, a trip to the doctor, or a sudden decision to skip school that particular day.[5] Because absentees had typically used drugs more frequently than students who were present during data collection, it was important to include them.

As Table 1 shows, these efforts also proved quite successful. The initial make-up session, conducted when the students were in grade 7, reduced the absentee rate by more than two-thirds (from 8.3 percent to 2.5 percent).[6] Subsequent efforts at Waves 2 through 6

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[4]See the Summary and Discussion at the end of this Note for an expanded discussion of the relationships among being Asian, doing well in school, and parent refusals under passive consent.

[5]Make-up sessions would be less likely to recapture students prone to chronic absenteeism or those suffering prolonged illnesses.

[6]At Waves 1 and 2, the make-up sessions were conducted in only 18 schools—those comprising the second wave of program implementation. These schools, nine of which had

yielded reductions of 50 percent or more. Overall, the make-up sessions retrieved close to 6 percent of the baseline sample at four of the five post-baseline waves. In addition, these sessions retrieved students who qualified as high-risk candidates for future drug use.[7]

Table 1

RESULTS OF MAKE-UP DATA COLLECTION
(Percent of baseline sample)

Item	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5	Wave 6
Absent before make-up	8.3	11.2	7.5	9.2	9.8	12.3
Absent after make-up	2.5	5.5	3.4	3.3	4.0	5.3
Percent reduction	69.9	50.9	54.7	64.1	59.2	56.9

NOTE: Baseline sample is defined as enrolled 7th grade students who filled out a survey at Wave 1. The Wave 1 calculations are based on the *target* population, all enrolled 7th graders in participating schools. Because Wave 1 and 2 make-ups were conducted only in the 18 schools participating in Project ALERT in the spring, the percentages reported for those two waves are calculated for the spring target population and the spring baseline sample, respectively.

REDUCING NONRESPONSE DUE TO STUDENT TRANSFERS

Perhaps the most significant threat to maintaining sample generalizability comes from student transfers out of the schools where data collection is conducted. In our study, 15 percent of the baseline sample—more than a thousand students—had transferred out of the participating schools by the time they were in the 8th grade, a proportion we expected to increase even more after the sample entered high school. Moreover, these transferees were disproportionately likely to come from groups that we hoped the prevention program would help—minority students, poor achievers, those from disrupted families with low socioeconomic status, and those with a higher propensity to become drug users or abusers (Ellickson, Bianca, and Schoeff, 1988). To learn how the 7th grade curriculum had affected them, we started tracking these at-risk students at Wave 3, after they had entered the 8th grade.

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a minority population of 50 percent or more, had significantly higher rates of absenteeism than did the first group of 12 schools.

[7]The Wave 2 marijuana and cigarette use profiles for the absentees who were recaptured at baseline were significantly higher than those of the respondents.

The overall tracking plan centered on a traditional mailed survey, with mail and telephone follow-ups plus monetary incentives. Within that overall strategy, we incorporated a new technique—obtaining information about what new school the student was attending and, when successful, mailing the questionnaire to that school rather than to the last known home address.[8]

That strategy was designed to mitigate the problems of locating a highly mobile population of young adolescents. Ninety percent of these student transferees had moved at least once, substantially reducing the likelihood of locating them at their old home addresses or finding a parent or relative at those addresses. Because the transferees were disproportionately likely to come from families with a high propensity for moving frequently, we also expected a substantial proportion to have out-of-date forwarding addresses. In addition, our information on persons or institutions that would know the transferees' new addresses was scanty at best. The students were too young to have drivers' licenses (which require updating in the event of a move); and during previous waves of data collection, many of them had difficulty providing complete, accurate, and legible information about third parties we might contact if they moved.

Despite the high mobility of our trackees, we succeeded in locating over 75 percent and obtaining completed surveys from two-thirds of those tracked. Before tracking, we had surveys from 80 percent of the original baseline sample; after tracking, we had surveys from 90 percent of that sample (see Fig. 1). Hence, this effort succeeded in reducing the trackees' nonresponse rate by two-thirds and cutting the overall attrition rate in half.

The "new school" strategy contributed substantially to these results. Mailings to the new school enabled us to find one-third of the transferees—44 percent of the students we located. The rest were located by more traditional means: surveys that were mailed to the old home address and subsequently forwarded to the new one plus telephone follow-ups in the new and old cities. The new-school mailing also accounted for 43 percent of the completed surveys. Hence this approach was an important component of the overall tracking process, but not an approach that can stand by itself.

These procedures also helped reduce the gap between the original baseline sample and the sample obtained through classroom data collection a year later. They did this by recapturing students whose profiles put them at greater risk for engaging in problem behavior. For example, 41 percent of our baseline sample reported that they did not live

[8]For more details on this method and its results, see Ellickson, Bianca, and Schoeff (1988).

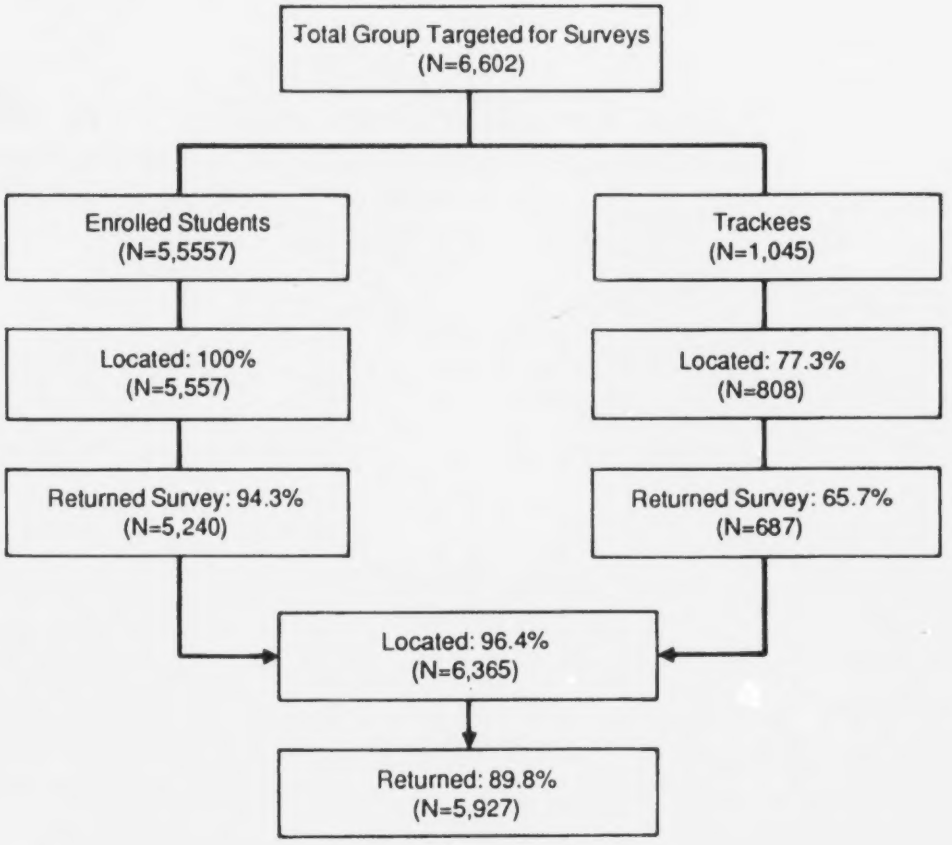

Fig. 1—Tracking results

with both natural parents. Following classroom collection at Wave 3, however, the obtained sample included only 37.5 percent from disrupted families—a gap of 3.5 percent. Tracking succeeded in recovering 57 percent of those students, leaving a loss of only 1.5 percent.

We calculated the percentage reduction in the gap between the baseline and Wave 3 samples along several other dimensions: race, deviant behavior, academic achievement, and lifetime use of cigarettes, alcohol, and marijuana. As Table 2 shows, our efforts to reduce the at-risk gap produced substantial improvements along each dimension, recapturing 40 percent or more of the problem-prone students in each category. We obtained the best

Table 2

RETAINING A SAMPLE THAT REFLECTS THE ORIGINAL: TRACKING RESULTS

Student Characteristic	Percent Recaptured by Tracking[a]
Disrupted family[b]	57
Deviant[c]	56
Grades of C or lower	49
Black	44
Tried cigarettes	49
Tried marijuana	44
Tried alcohol	43

[a]Reflects the proportion of the loss *before* tracking that was recovered by the tracking process.
[b]Students who were not living with both natural (or "original") parents.
[c]Students who scored >.25 on a deviant behavior scale tapping truancy, vandalism, lying, cheating, and stealing.

results—retrievals of 50 percent or more of the loss—for students from disrupted homes and for those who had engaged in deviant activities (truancy, vandalism, lying, cheating, or stealing).

SUMMARY AND DISCUSSION

The three methods described here fulfilled their promise: They produced substantial reductions in the expected loss attributable to parental nonresponse to the consent process, absenteeism, and student mobility. By using a multistage parent consent process that included multiple channels of communication, we minimized the risk of mistakenly treating nonresponse as consent and avoided losing between 40 and 50 percent of the targeted population at the outset. Over several waves of data collection, make-up sessions reduced the losses attributable to absenteeism by an average of nearly 60 percent, recapturing close to 6 percent of the baseline sample each year. Finally, the tracking process succeeded in retrieving surveys from two-thirds of the transferees and cut the overall attrition rate in half.

These efforts also reduced attrition bias attributable to the loss of at-risk students. Tracking recaptured students with various at-risk characteristics—poor grades, prior deviance and drug use, and disrupted family lifestyles. The use of passive consent prevented the anticipated loss of students with lower grades and higher absentee records, characteristics that typically predict future drug use or other problem behavior.

If anything, passive consent led to the loss of comparatively more low-risk students—those with Asian backgrounds and slightly above-average grades. This result suggests that different kinds of parents refuse under the two methods. Those who refuse under *passive* consent are not, as research on active consent would suggest, more likely to be the parents of at-risk children. In fact, they appear more likely to have children with lower risk profiles. Hence an unanticipated result of passive consent procedures may be greater retention of the very children many researchers are most interested in studying—those who particularly need prevention programs or other forms of assistance because they are the most likely to engage in deviant behavior.

Why do the two methods yield such contrasting refusal profiles? We suspect that the answer lies in the different meaning of a refusal under the two procedures. Our earlier research suggested that parental refusals under active consent procedures typically reflected parental inertia rather than a deliberate decision to oppose their child's participation in the research (Ellickson and Hawes, in press). Because failure to respond counts as a refusal under active consent, many parents who actually agree with the research *but lack the motivation to complete and mail the form* end up in the refusal column. This explanation applied to the great majority of parents who failed to respond within two weeks of our active consent mailout: We ultimately obtained approval from almost 90 percent of them, but only after instituting highly costly and time-consuming efforts to retrieve forms from all parents.

These results suggest that disproportionate losses of at-risk children under active consent do not occur because of parental opposition to the research, but because apathetic parents are disproportionately likely to have at-risk children. Indeed, our findings suggest that such parents would actually agree to the research if they could only be induced to pay more attention to the consent materials.

Passive consent, on the other hand, appears to yield considered refusals from parents who have relatively little reason to fear negative results from disclosure of sensitive information about their child. As a group, Asian children, as well as those who do well in school, are not high-risk candidates for problem behavior; while their parents may oppose the collection of sensitive data (or any data at all) from their children, it is unlikely that they do so out of fear that their children will be implicated by their answers.

That the two consent methods can produce striking differences in sample composition as well as sample size has profound implications for research conducted with children. We have documented these differences and have suggested plausible hypotheses for how and why they occur. Additional studies with different populations and research programs would expand our understanding of how each method works.

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